

**REMARKS**

This Request for Reconsideration is being filed in response to the Final Rejection dated March 8, 2004. For the following reasons, this application should be in condition for allowance and the case passed to issue.

Claims 7-10 and 13-21 are pending in this application. Claims 1-6, 11, and 12 have been cancelled. Claims 7-9 are withdrawn. Claims 10 and 13-21 are rejected.

***Claim Rejection Under 35 U.S.C. § 102***

Claim 17 is rejected under 35 U.S.C. 102(e) as being anticipated by Fukui et al. (U.S. Patent No. 6,100,594). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the instant invention as claimed, and the cited prior art.

An aspect of the present invention, per claim 17, is a semiconductor device comprising a circuit board, a first semiconductor chip positioned on the circuit board, and a second semiconductor chip positioned on the first semiconductor chip. The circuit board has first and second pads spaced away from each other along an outer periphery of the first semiconductor chip and the first semiconductor chip has third and fourth pads spaced away from each other along an outer periphery of the second semiconductor chip. The third and fourth pads are positioned adjacent the first and second pads and a wire printed on the first semiconductor chip connects the third and fourth pads.

The Examiner asserts that Fukui discloses a semiconductor device comprising a circuit board 5, first semiconductor chip 1, second semiconductor chip 2, first and second

pads 13 on the circuit board, third and fourth pads 17a on the first semiconductor chip, and a fifth pad 17b on the second semiconductor chip.

Fukui, however, does not disclose that the third and fourth pads are connected by a wire, as required by claim 17.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Fukui does not disclose that the third and fourth pads are connected by a wire, as required by claim 17, Fukui does not anticipate the claimed semiconductor device.

Applicants further submit that Fukui does not suggest the claimed semiconductor device.

### ***Claim Rejection Under 35 U.S.C. § 103***

Claims 10 and 13-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over alleged admitted prior art (APA) in view of Fukui and Kozono (U.S. Patent No. 5,399,904). This rejection is traversed, and reconsideration and withdrawal respectfully requested. The following is a comparison between the instant invention as claimed, and the cited prior art.

Claim 10 requires a first semiconductor chip positioned on the circuit board and a second semiconductor chip positioned on the first semiconductor chip. The circuit board has a first pad, a second pad spaced away from the first pad in a direction along the outer periphery of the semiconductor chip, and a wire connecting between the first pad and the second pad on a surface of the circuit board supporting the first semiconductor chip. The wire extends along the outer periphery of the first semiconductor chip between the first and second pads. The wire is printed on the circuit board together with the first pad and the second pad. The second semiconductor chip has a third pad positioned adjacent to the second pad but away from the first pad on the circuit board. The second pad on the circuit board and the third pad on the second semiconductor chip are electrically connected through a bonding wire so that the third pad on the second semiconductor chip is electrically connected with the first pad on the circuit board through the wire, the second pad on the circuit board, and the wire on the circuit board.

The Examiner asserts that the APA discloses a semiconductor device including a circuit board 102, semiconductor chips 110, 112, pads 104, 114, and bonding wires 116. The Examiner acknowledges that the APA fails to specify the second pad spaced away from the first pad in a direction along the outer periphery of the chip and a wire being printed on the board, the wire connecting the first and second pad. The Examiner asserts that Kozono teaches a circuit board substrate having an array of bonding/connection pads, such that the bonding /connection pads are spaced from each other along outer periphery/peripheral edges of a chip (FIG. 2). The Examiner relies on Fukui for teaching a wiring portion/trace pattern on a circuit board/substrate formed using conventional metal deposition and photolithography/printing processes. The Examiner concludes that it would have been

obvious to incorporate the circuit board having a first pad such that the second pad is spaced away from the first pad in a direction along the outer periphery of the chip and the circuit board further having a wire connecting the first and second pads, the wire being printed on the circuit board together with the first and second pads and being extended along the outer periphery of the first chip between the first and second pads so that bonding wire density can be increased and wire bonding defects can be reduced.

The APA, Kozono, and Fukui, whether taken alone, or in combination, fail to suggest the claimed semiconductor device. There is no suggestion in the cited references to modify the APA to include a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of the first semiconductor chip, and a wire connecting between the first pad and the second pad, the wire extending along the outer periphery of the first semiconductor chip between the first and second pads, as required by claim 10.

Fukui in FIG. 7(a) teaches two pads spaced away from each other and connected by a wire in a **direction extending away from** the outer peripheral edge of the semiconductor chip, not along the outer periphery of the chip, as required by claim 10.

Typically, when a semiconductor device has a first chip provided on a circuit board and a second chip provided on the first chip, the connecting line between the top smaller chip and the base circuit board tend to extend obliquely, which may cause unwanted crossing and extension of the bonding wires. However, the claimed arrangement of the pads on the circuit board solves such problems.

Kozono does not suggest modifying the APA. Kozono does not teach that a semiconductor chip is positioned on the circuit board, rather Kozono discloses that a

semiconductor chip is located in an aperture in the circuit board. Further, Kozono does not disclose a second semiconductor chip positioned on the first semiconductor chip.

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge readily available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). There is no suggestion in Kozono to form a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of a first semiconductor chip on a circuit board, and to form a wire connecting the first pad and the second pad on the circuit board, the wire extending along the outer periphery of the first semiconductor chip between the first and second pads, as required by claim 10. Kozono does not suggest that arranging the first and second pads, as required by claim 10, will increase bonding wire density and reduce bonding wire defects, as concluded by the Examiner.

The requisite motivation to support the ultimate legal conclusion of obviousness under 35 U.S.C. § 103 is not an abstract concept, but must stem from the applied prior art as a whole and realistically impel one having ordinary skill in the art to modify a specific reference in a specific manner to arrive at a specifically claimed invention. *In re Deuel*, 51 F.3d 1552, 34 USPQ2d 1210 (Fed. Cir. 1995); *In re Newell*, 891 F.2d 899, 13 USPQ2d 1248 (Fed. Cir. 1989). Accordingly, the Examiner is charged with the initial burden of identifying a source in the applied prior art for the requisite realistic motivation. *Smiths Industries Medical System v. Vital Signs, Inc.*, 183 F.3d 1347, 51

USPQ2d 1415 (Fed. Cir. 1999); *In re Mayne*, 104 F.3d 1339, 41 USPQ2d 1449 (Fed. Cir. 1997). There is no motivation in the cited references to a form a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of a first semiconductor chip on a circuit board and connected by a wire, the wire extending along the outer periphery of the first semiconductor chip between the first and second pads.

The only teaching of the claimed semiconductor device is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner's conclusion of obviousness is not supported by any suggestion in the prior art to modify the APA. The Examiner's retrospective assessment of the claimed invention and use of unsupported conclusory statements are not legally sufficient to generate a case of *prima facie* obviousness. It appears the Examiner's conclusion of obviousness is rooted in improper hindsight reasoning.

Claim 18 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukui in view of the alleged APA. This rejection is traversed, and reconsideration and withdrawal respectfully requested.

Claim 18 is allowable for at least the same reasons as independent claim 17. The APA does not cure the deficiencies of Fukui. There is no suggestion in the APA to connect the third and fourth pads with a wire, as required by claim 17.

Claims 19 and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukui in view of Lee et al. (U.S. Patent No. 5,606,196). This rejection is traversed,

and reconsideration and withdrawal respectfully requested. The following is a comparison between the instant invention as claimed, and the cited prior art.

Claim 19 requires a first semiconductor chip positioned on a circuit board and a second semiconductor chip positioned on the first semiconductor chip. The circuit board has a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of the first semiconductor chip. The second semiconductor chip has a third pad positioned adjacent to the second pad but away from the first pad on the circuit board. The first and second pads on the circuit board and the second pad on the circuit board and the third pad on the second semiconductor chip are electrically connected through respective bonding wires.

The Examiner asserts that Fukui substantially teaches the claimed semiconductor device except for the first and second pads on the circuit board being electrically connected through a bonding wire. The Examiner alleges that Lee teaches a high density chip package (HDCP) where a single or plurality of bonding/screening wires 88 are used to provide an electrical connection between bonding sites/pads on a printed wiring board. The Examiner concludes that it would have been obvious to incorporate first and second pads on the circuit board being electrically connected through the bonding wire so that mutual inductance and cross-talk can be reduced.

Contrary to the Examiner's assertion, the combination of Fukui and Lee does not suggest the claimed semiconductor device. The Examiner asserted bonding sites on the Lee circuit board extend orthogonal to the outer periphery of the semiconductor chip, not along the outer periphery of the first semiconductor chip, as required by claim 19.

Furthermore, the asserted first and second pads of Lee are not electrically connected to the third pad, as required by claim 19.

The screening wires are electrically isolated from the electrical circuit of the Lee device, and have a identical or similar height and shape as the bonding wires to reduce the inductance and crosstalk of the bonding wires. There is no suggestion in Lee to modify Fukui to include a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of the first semiconductor chip, wherein the first, second, and third pads are electrically connected, as required by claim 19, so that mutual inductance and cross-talk can be reduced. Lee does not suggest a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of the first semiconductor chip, wherein the first, second, and third pads are electrically connected, as required by claim 19. Even if it were obvious to combine Lee with Fukui, though Applicants submit it is not obvious, the claimed semiconductor device would not result from the combination of Lee and Fukui. As explained above, Lee does not suggest that the screening wire connecting the asserted first and second pads is electrically connected to a third pad on a second semiconductor chip.

Claim 21 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Fukui in view of Lee and further in view of the alleged APA. This rejection is traversed, and reconsideration and withdrawal respectfully requested.

Claim 21 is allowable for at least the same reasons as claim 19. The APA does not cure the deficiencies of Fukui and Lee, as the APA does not suggest a first pad and a second pad spaced away from the first pad in a direction along an outer periphery of the



first semiconductor chip, wherein the first, second, and third pads are electrically connected.

Applicants submit that the dependent claims are allowable for at least the same reasons as the independent claims from which they depend and further distinguish the claimed invention.

In light of the remarks above, this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

MCDERMOTT WILL & EMERY LLP



Brian K. Seidleck, Reg. No. 51,321

For: Bernard P. Codd, Reg. No. 46,429

600 13<sup>th</sup> Street, N.W.  
Washington, DC 20005-3096  
(202) 756-8000 BPC/BKS:kap  
Facsimile: (202) 756-8087  
**Date: July 7, 2004**